

Foreign Availability of Petroleum Equipment

Over the years the USSR has provided the bulk of the equipment it requires to produce oil and gas and has adapted Western technology where needed. During the past decade, however, the Soviets have encountered increasingly difficult problems in locating new reserves, in increasing drilling to compensate for wells of lower productivity, in coping with rising volumes of fluid (oil and water), in undertaking an offshore exploration and production program and in transporting gas. Soviet reports indicate that domestic equipment manufacturers have been unable to meet the rapidly rising demands for more and better items for the petroleum industry to solve these problems. As a result the USSR has made selective purchases of Western equipment and know-how that have helped to maintain its role as a major oil and gas producer.

For the decade of the 1980s the Soviet Union will have to rely more heavily on Western technology and equipment to maintain production of oil, explore and develop deeper onshore areas and offshore waters, and to transport a huge volume of gas to domestic and foreign customers. Major shortcomings in petroleum technology lie in the areas of seismic data collection systems, high pressure drilling equipment, artificial fluid lift, offshore survey and drilling operations, and large gas compressors.

US companies have dominated the world market for petroleum industry equipment and technology for decades. Most oil and gas producing equipment has been developed in the US and has found large markets overseas. The result has been that the bulk of the equipment and technology for exploration, drilling and production operations are supplied by US firms, their foreign subsidiaries, or licensees. US domination of the petroleum equipment markets has rested not only on unique technology embodied in the product, but also on experience in product design and application, and on the follow-on services provided by a large engineering/sales force. US firms have also maintained an edge in providing technical support and engineering follow-up, such as proper installation and operation of some of the more easy-to-manufacture equipment such as valves, mandrels, and packers.

There are no permanent barriers to new foreign competition in the long run, however, as events in the petroleum equipment industry have shown. Few patents exist to prevent copying; still fewer patents are enforceable in foreign courts of law from a practical standpoint. Moreover, some foreign licensees of US firms may decide, despite their contractual obligations, to enter the Soviet market. Those licensees in a weak competitive position

would be especially tempted to take this road. Nor is there any certainty that subsidiaries would follow the lead of the parent company--either because of pressure from the host country or permission from the parent firm.

US dominance has been reduced over the years not only because of licensed production, subsidiaries and foreign affiliates, but because West European and Japanese competitors have proved increasingly capable of entering the growing world market in selective areas as technology has become generally more available.

As the attached information indicates, foreign suppliers can satisfy the needs of the Soviet petroleum industry with the major exception of high capacity electric submersible pumps. US submersible pumps have been important to the USSR, contributing at least one million barrels per day to Soviet oil production. These pumps enable the Soviets to lift high volumes of fluid in wells that have stopped flowing. Gas lift equipment--which is also manufactured abroad--is a substitute for submersible pumps but substantially more lead time is required to put it into operation.

The Soviets have made it clear that even where they prefer US equipment--large turbines for gas compressor stations, for example--they are now excluding US suppliers whenever possible. For some items their options are limited--pipelayers and large turbines are major examples--but for most other items there are several alternative suppliers many of whom can furnish equipment at a technological level not significantly lower than and sometimes as good as that available in the United States.

LARGE TURBINE COMPRESSORSUSE

Natural gas transmission service on large diameter pipelines.

MAJOR US PRODUCERS

GE, Westinghouse, Dresser-Clark, Allis Chalmers

US LICENSEES

GE (West Germany, MTU)

Cooper Industries (UK)

US SUBSIDIARIES AND AFFILIATES

None

FOREIGN COMPETITORS

Rolls-Royce (UK)

Hitachi (Japan)

Creusot-Loire (France)

Thomassen (Netherlands)

Nuovo Pignone (Italy)

REMARKS

Rolls Royce has capacity to produce over 300 (RB-211) aircraft engines per year, and sales are running at about 100 annually. Rolls could supply all the aircraft-derivative type turbine compressors needed for the Yamburg export line. GE's licensee has some excess capacity to build aircraft-derivative compressors. Foreign competitors in France, Japan and Italy can supply large industrial type compressors, but it is uncertain how many could be supplied.

56" (1420 mm) STEEL PIPE

USE

For transcontinental natural gas pipelines

MAJOR US PRODUCERS

None

US LICENSEES

None

US SUBSIDIARIES AND AFFILIATES

None

FOREIGN COMPETITORS

Mannesmann (West Germany)

Sumitomo, NKK, Nippon Steel, Kawasaki (Japan)

Italsider (Italy)

Granges Hedland (Sweden)

REMARKS:

Burgeoning Soviet demand for large-diameter steel pipe could tax capacity of producers. There is very limited demand for 56" pipe in the non-Communist world.

SECRET

PIPELAYERS, TRACTORS, EXCAVATORS

USE

Large diameter pipeline construction

MAJOR US PRODUCERS

Caterpillar - pipelayers & tractors (largest producer in world)

Bucyrus Erie, John Deere - Excavators

US LICENSEES

The Polish licensee of International Harvester builds a tractor which can be fitted with a pipelaying boom. Production capacity is unknown.

US SUBSIDIARIES AND AFFILIATES

None

FOREIGN COMPETITORS

Pipelayers, excavators and tractors - Komatsu (Japan)

Tractors and pipelayers - Fiat-Allis (Italy)

REMARKS:

Komatsu produces over 700 heavy duty tractors per year and 10-15 percent of these are converted to pipelayers. Komatsu also produces its own excavator which is large enough for 56-inch linepipe. Fiat-Allis will begin producing new pipelayers by end of 1981 or early 1982.

LARGE DIAMETER BALL AND GATE VALVESUSE

For controlling natural gas flows in high pressure pipelines.

MAJOR US PRODUCERS

Grove-Walworth, WKM, Daniel (M&J Ind.)

US LICENSEES

WKM - Tsukamoto Seiki Co. (Japan)

US SUBSIDIARIES AND AFFILIATES

Cameron (France)

WKM (Japan)

Grove (Italy)

FOREIGN COMPETITORS

Borsig (West Germany)

Kitz (Japan)

REMARKS:

Excess foreign capacity for the manufacture of large diameter valves has led to severe competition between French, Italian and Japanese firms for new Soviet orders. The Japanese currently undersell competitors by 35 percent and there has been little or no price increase in these items since 1974 due to Japanese competitiveness.

EXPLORATION EQUIPMENT

(Seismic equipment, espec. computers and associated software; well-logging equipment)

USE

Seismic equipment and related interpretive tools are used to identify promising structures and traps. Well logging equipment is used to evaluate formations tapped by exploration wells.

MAJOR US PRODUCERS

Seismic: Raytheon, Dresser, Texas Instruments, Western Geophysical, Petty, Ray, Geospace, Seiscom-Delta

Well logging: Gearhardt-Owen, Dresser

US LICENSEES

None

US SUBSIDIARIES AND AFFILIATES

None

FOREIGN COMPETITORS

Seismic: Sercol (France), Prakla (West Germany)

Well logging: Schlumberger (France) (Romania)

REMARKS:

The USSR needs seismic interpretation equipment as its search for oil moves to deeper, more subtle stratigraphic traps and to find oil and gas in offshore areas. Although seismic equipment cannot help the USSR in the short run, it is needed now to improve the reserves-to-production ratio. USSR has preference for US seismic equipment and software. US firms have an edge over foreign firms in their ability to provide sophisticated software and computer programs to interpret seismic data. Nonetheless, foreign firms can provide for Soviet needs in this area with little degradation of quality of equipment and services. In well logging the French firm of Schlumberger is the world's leader.

DRILLING RIGS (ONSHORE)

(Complete assemblies)

USE

Drilling of exploratory and development oil and gas wells.

MAJOR US PRODUCERS

Armco, US Steel, Youngstown Steel, Dresser, L.E. Moore, Jones & Laughlin, Texas International, Pyramid

US LICENSEES

Armco (Japan, Italy)

US SUBSIDIARIES AND AFFILIATES

Armco (Mexico)

Dresser (Mexico, Canada)

Texas International (Canada, Venezuela)

FOREIGN COMPETITORS

Wirth, Salzgitter (West Germany)

Dreco (Canada)

Romania, Yugoslavia

REMARKS:

Soviet rigs are heavy, bulky and difficult to move. USSR could use more portable and lightweight rigs built in West (mostly in US), but have shown interest only in offshore rigs and special drilling tools available only in the US.



DRILL BITSUSE

All drilling operations. Best bits have sealed journal bearings and tungsten carbide cutting surfaces.

MAJOR US PRODUCERS

Hughes, Dresser, Smith International, Reed, Christenson (diamond bits)

US LICENSEES

Hughes (Tsukamoto Seiki, Japan)

US SUBSIDIARIES AND AFFILIATES

Hughes (Ireland, Mexico, Venezuela, Argentina, Canada, Singapore)

Smith (Italy, Mexico, Canada, India)

Dresser (Mexico, France, Canada, Argentina)

Reed (Canada, Netherlands, Australia)

FOREIGN COMPETITORS

Creusot-Loire (France)

Diamant Boart (Belgium) - diamond bits

Romania

REMARKS

USSR drilling needs will escalate rapidly in 1980s. The Dresser drill bit plant would substantially improve Soviet bit productivity, which is poor by international standards. Foreign competitors cannot match output of US companies, their subsidiaries and licensees nor could they build a plant as quickly as US companies. Japanese competition is increasing.

BLOW-OUT PREVENTERS AND HYDRAULIC CONTROLSUSE

Blow-out preventors with remote controls are installed at the wellhead to control high pressure flows of oil and gas during drilling. Remote hydraulic controls insure the rapid activation of the gag and ram type preventors.

MAJOR US PRODUCERS

BOPs -- NL Industries, Cameron, Hydril, Vetco  
Controls-P. Koomey Inc. (production in Mexico)

US LICENSEES

Cameron (Rauma Repola, Finland)  
NL Industries - (? - Japan)

US SUBSIDIARIES AND AFFILIATES

Cameron (France)  
Vetco (UK)  
P. Koomey Ind. (Mexico)  
Wagner Industries (Canada)

FOREIGN COMPETITORS

Unknown (Japan)  
Romania

REMARKS

Most hydraulic controls and BOPs in 3,000-20,000 psi range are produced in US. Little foreign competition now, but France and Japan are developing capability. NL Industries sold the USSR a license to build an entire BOP system in 1977, but Soviet plant apparently still not in production.

TOOL JOINTS, DRILLPIPE AND COLLARSUSE

Each of these items are part of the drill string. Tool joints are heavy threaded couplings linking joint pieces of drill pipe. Drill collars are heavy, thick-walled tubes used to add weight and strength to the end of the drill string above the bit.

MAJOR US PRODUCERS

Hughes, Smith International, Reed, Grant, Flame, Gray, Dresser, Armco, US Steel, Jones & Laughlin, Lone Star, Baasch-Ross, Omsco, Tech Drilling Tools

US LICENSEES

Hughes (Italy, Japan)

US SUBIDIARIES AND AFFILIATES

Hughes (Ireland, Mexico, Canada, Singapore, Argentina, Venezuela, Brazil, Netherlands, Australia)

Smith (Mexico, Canada, West Germany, Italy, UK)

Reed (Canada, Netherlands, Australia)

FOREIGN COMPETITORS

Creusot Loire - SMF-Marep (France)

Breda Fucine, Dalmine, Italsider (Italy)

NKK (Japan)

Mannesmann (West Germany)

REMARKS:

Foreign competitors could expand capacity to supply Soviet market.

HIGH CAPACITY ELECTRIC SUBMERSIBLE PUMPS

USE

For production of oil in old wells with high watercuts.

MAJOR US PRODUCERS

TRW (Reda), Hughes-Byron Jackson and Oil Dynamics produce all of these pumps

US LICENSEES

None

US SUBSIDIARIES AND AFFILIATES

TRW (West Germany) - for water wells but could convert to oil

FOREIGN COMPETITORS

Possibly some output in Romania

REMARKS:

Design technology relatively simple but production know-how needed for reliable operating service. US pumps have been important for Soviets in maintaining oil production as water cuts rise. Soviet pumps are of poor quality and low capacity.

DOWNHOLE COMPLETION EQUIPMENT

(packers, tubing, casing and safety valves)

USE

Proper casing and tubing must be selected to protect the wellbore, while packers seal off the producing zone. Safety valves close off the high pressured flows of oil and gas during maintenance operations.

MAJOR US PRODUCERS

Camco, Baker, Halliburton-Otis

US LICENSEES

None

US SUBSIDIARIES AND AFFILIATES

Camco - (UK, Singapore, Argentina, Canada, Ireland)

Baker - (UK, Singapore, Argentina, Canada)

Otis - (UK, Singapore)

FOREIGN COMPETITORS

Hungary makes packers which work efficiently in oil wells, but not in gas wells. There are no competitors that manufacture gas well packers the USSR needs.

REMARKS:

The USSR imports only a small percentage of its needs in this area, principally for large diameter gas wells in the Arctic or for corrosive sour gas wells in Central Asia, Astrakhan and Orenburg. Three US firms and their subsidiaries dominate this industry. All of this equipment could be produced abroad, but are not at present.

SECRET

GAS LIFT EQUIPMENT

(packers, landing nipples, mandrels and  
sidepocket valves, kickover tools)

USE

A substitute for high capacity electric submersible pumps in the production of oil from old high-watercut wells. Gas lift wells usually require far less maintenance than pumping wells because wireline kickover tools can replace valves from the surface. However, putting gas lift equipment into operation takes a considerably longer time than it does with submersible pumps.

MAJOR US PRODUCERS

Camco, Baker, Halliburton-Otis, Dresser

US LICENSEES

None

US SUBSIDIARIES AND AFFILIATES

Camco (Ireland, Canada, Singapore, Mexico, Venezuela)

Baker (UK, Singapore, Canada, Mexico)

Halliburton-Otis (UK)

FOREIGN COMPETITORS

Flopetrol (France)

Mexico ?

REMARKS:

US firms agree that it would be easy for foreign competitors to copy gas lift mandrels with sidepocket valves and packers. All patents have expired. Engineering design and proper installation of gas lift systems may be just as important as the hardware for reliable, efficient production operations.

WELLHEADS AND CHRISTMAS TREESUSE

Wellheads are placed on the surface to support long strings of producing casing and tubing in wells. Trees are installed on top of the wellhead to control high pressure flows of oil and gas.

MAJOR US PRODUCERS

FMC, Cameron, WKM, Dresser, Armco, Rockwell, US Steel, Vetco, OCT, Gray, McEvoy

US LICENSEES

WKM (Tsukamoto Seiki, Japan)

US SUBSIDIARIES AND AFFILIATES

All US companies listed above have foreign subsidiaries in a dozen countries (Europe, Africa, Asia, So. America)

FOREIGN COMPETITORS

Voest (Austria)

Breda Fucine (Italy)

Tsukamoto Seiki (Japan)

Luceot (France)

Borsig (West Germany)

Neuman (UK)

REMARKS

Most Soviet needs met internally, but imports needed for Arctic use and very severe service in corrosive sour gas wells. Foreign competitors could supply Soviet needs. US companies and subsidiaries produce most of non-Communist world's needs.